WHAT IS CLAIMED IS:

1. A substantially pure and isolated DNA fragment comprising a nucleic acid sequence as shown in SEQ ID NO. 1.

2. The DNA fragment of claim 1, wherein the DNA fragment comprises at least part of the complementary determining region-3 (CDR3) of T cell receptor beta-chain BV14 gene in an individual suffering from rheumatoid arthritis.

3. A substantially pure and isolated DNA fragment comprising a nucleic acid sequence as shown in SEQ ID NO. 2.

4. The DNA fragment of claim 3, wherein the DNA fragment comprises at least part of the complementary determining region-3 (CDR3) of T cell receptor beta-chain BV16 gene in an individual suffering from rheumatoid arthritis.

5. A vaccine comprising at least one DNA fragment selected from the group consisting of SEQ ID NO. 1 and SEQ ID NO. 2.

6. The vaccine of claim 5, wherein the DNA fragment is present at a concentration range of about 10 μg/ml to about 10 mg/ml.

7. A substantially pure and isolated peptide having an amino acid sequence selected from the group consisting of SEQ ID NO. 3 and SLS.

8. The peptide of claim 7, wherein the peptide has an amino acid sequence derived from the complementary determining region-3 (CDR3) of T cell receptor beta-chain BV14 gene in an individual suffering from rheumatoid arthritis.

9. An antibody directed against the peptide of claim 8.

10. A substantially pure and isolated peptide having an amino acid sequence selected from the group consisting of SEQ ID NO. 4, SQD, SLL and SEQ ID NO. 5.

11. The peptide of claim 10, wherein the peptide has an amino acid sequence derived from the complementary determining region-3 (CDR3) of T cell receptor beta-chain BV16 gene in an individual suffering from rheumatoid arthritis.

12. An antibody directed against the peptide of claim 11.

13. A vaccine comprising at least one peptide having an amino acid sequence derived from the complementary determining region-3 (CDR3) of a T cell receptor gene selected from the group consisting of BV14 and BV16 in an individual suffering from rheumatoid arthritis.

14. The vaccine of claim 13 comprising at least one peptide having an amino acid sequence selected from the group consisting of SEQ ID NO. 3, SLS, SEQ ID NO. 4, SQD, SLL and SEQ ID NO. 5.

15. A method for detecting rheumatoid arthritis in an individual suspected of having rheumatoid arthritis, comprising the steps of:

(a) obtaining a tissue sample from the suspected individual;

(b) measuring the expression level of BV14 and/or BV16 of T cell receptors in the tissue sample; and

(c) repeating steps (a) through (b) on a normal individual;

wherein a substantially higher expression level of BV14 and/or BV16 in the suspected individual than that in the normal individual indicates a possible detection of rheumatoid arthritis in the suspected individual.

16. The method of claim 15, wherein the tissue sample is obtained from synovial fluid, synovial lesion tissue, or peripheral blood of the suspected and normal individuals.

17. A method for detecting rheumatoid arthritis in an individual of Chinese population who is suspected of having rheumatoid arthritis, comprising the steps of:

(a) obtaining a tissue sample from the suspected individual;

(b) measuring the expression level of BV16 of T cell receptors in the tissue sample; and

(c) repeating steps (a) through (b) on a normal individual of Chinese population;

wherein a substantially higher expression level of BV16 in the suspected individual than that in the normal individual indicates a possible detection of rheumatoid arthritis in the suspected individual of Chinese population.

18. The method of claim 17, wherein the tissue sample is obtained from synovial fluid, synovial lesion tissue, or peripheral blood of the suspected and normal individuals of Chinese population.

19. A method for detecting rheumatoid arthritis in an individual suspected of having rheumatoid arthritis, comprising the steps of:

(a) generating a probe complementary to a DNA fragment having a nucleic acid sequence selected from the group consisting of SEQ ID NO. 1 and SEQ ID NO. 2;

(b) obtaining a tissue sample from the suspected individual; and

(c) mixing the probe with the tissue sample, wherein a positive hybridization signal indicates a possible detection of rheumatoid arthritis in the suspected individual.

20. The method of claim 19, wherein the tissue sample is obtained from synovial fluid, synovial lesion tissue, or peripheral blood of the suspected and normal individuals.

21. A method for detecting rheumatoid arthritis in an individual suspected of having rheumatoid arthritis, comprising the steps of:

(a) generating an antibody directed against a peptide having an amino acid sequence selected from the group consisting of SEQ ID NO. 3, SLS, SEQ ID NO. 4, SQD, SLL and SEQ ID NO. 5;

(b) obtaining a tissue sample from the suspected individual; and

(c) mixing the antibody with the tissue sample, wherein a positive signal indicates a possible detection of rheumatoid arthritis in the suspected individual.

22. The method of claim 21, wherein the tissue sample is obtained from synovial fluid, synovial lesion tissue, or peripheral blood of the suspected and normal individuals.

23. A method for treating rheumatoid arthritis in an individual suffering from rheumatoid arthritis, comprising the step of:

administering to the individual with an effective amount of an immunogenic T cell receptor peptide to elicit an immune response, the peptide comprising an amino acid sequence selected from the group consisting of SEQ ID NO. 3, SLS, SEQ ID NO. 4, SQD, SLL and SEQ ID NO. 5.

24. A method for treating rheumatoid arthritis in an individual suffering from rheumatoid arthritis, comprising the step of:

administering to the individual with an effective amount of an antibody directed against a peptide having an amino acid sequence selected from the group consisting of SEQ ID NO. 3, SLS, SEQ ID NO. 4, SQD, SLL and SEQ ID NO. 5.

25. A method of preventing or treating rheumatoid arthritis in an individual, comprising the steps of:

(a) administering to the individual with a DNA expression vector comprising a promoter operably linked to a DNA fragment having a nucleic acid sequence encoding a single chain T cell receptor variable beta 16 (Vβ16) peptide, or fragments thereof; and

(b) expressing the DNA fragment in the individual, the DNA fragment is expressed at a level sufficient to elicit an immune response against the encoded peptide thereby preventing onset of rheumatoid arthritis or treating rheumatoid arthritis in the individual.

26. The method of claim 25, wherein the nucleic acid sequence encodes the complementary determining region-3 (CDR3) of Vβ16.

27. The method of claim 26, wherein the nucleic acid sequence comprises a sequence as shown in SEQ ID NO. 2.

28. The method of claim 26, wherein CDR3 of Vβ16 comprises an amino acid sequence selected from the group consisting of SEQ ID NO. 4, SQD, SLL and SEQ ID NO. 5.

29. The method of claim 25, wherein the promoter is inducible or constitutive.

30. The method of claim 29, wherein the promoter includes β-actin promoter, SV40 early and late promoter, immunoglobulin promoter, human cytomegalovirus promoter, and retroviral LTRs.

31. The method of claim 25, wherein the DNA expression vector is administered to the individual subcutaneously, intradermally, intravenously, or orally.

32. The method of claim 31, wherein the DNA expression vector is administered to the muscle tissue of the individual.

33. The method of claim 31, wherein the DNA expression vector is administered to the spinal fluid of the individual.

34. A method of preventing or treating rheumatoid arthritis in an individual, comprising the steps of:

(a) administering to the individual with a DNA expression vector comprising a promoter operably linked to a DNA fragment having a nucleic acid sequence encoding a single chain T cell receptor variable beta 14 (Vβ14) peptide, or fragments thereof, the nucleic acid sequence comprising a sequence as shown in SEQ ID NO. 1; and

(b) expressing the DNA fragment in the individual, the DNA fragment is expressed at a level sufficient to elicit an immune response against the encoded peptide thereby preventing onset of rheumatoid arthritis or treating rheumatoid arthritis in the individual.

35. The method of claim 34, wherein the nucleic acid sequence encodes the complementary determining region-3 (CDR3) of Vβ14.

36. The method of claim 35, wherein CDR3 of Vβ14 comprises an amino acid sequence selected from the group consisting of SEQ ID NO. 3 and SLS.

37. The method of claim 34, wherein the promoter is inducible or constitutive.

38. The method of claim 37, wherein the promoter includes β-actin promoter, SV40 early and late promoter, immunoglobulin promoter, human cytomegalovirus promoter, and retroviral LTRs.

39. The method of claim 34, wherein the DNA expression vector is administered to the individual subcutaneously, intradermally, intravenously, or orally.

40. The method of claim 39, wherein the DNA expression vector is administered to the muscle tissue of the individual.

41. The method of claim 39, wherein the DNA expression vector is administered to the spinal fluid of the individual.

42. A pharmaceutical composition for suppressing pathogenic T cell response in an individual suffering from rheumatoid arthritis, comprising an immunologically effective amount of a peptide derived from a single chain T cell receptor variable beta 14 (Vβ14) or 16 (Vβ16), or fragments thereof, and a pharmaceutically acceptable carrier.

43. The pharmaceutical composition of claim 42, wherein the peptide has an amino acid sequence derived from the complementary determining region-3 (CDR3) of Vβ14 or Vβ16.

44. The pharmaceutical composition of claim 43, wherein the peptide comprises an amino acid sequence selected from the group consisting of SEQ ID NO. 3, SLS, SEQ ID NO. 4, SQD, SLL and SEQ ID NO. 5.